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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 09/683,326
Filing Date: December 14, 2001
Appellant(s): YU ET AL.

Melanie L. McCollum
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 1/18/05.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The following are the related appeals, interferences, and judicial proceedings known to the examiner which may be related to, directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal:

09/683,329 is on appeal and has related issues

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

The following is a listing of the evidence (e.g., patents, publications, Official Notice, and admitted prior art) relied upon in the rejection of claims under appeal.

Yu	U.S. Patent 5,688,355	Nov. 18, 1997
Schlueter, Jr. et al.	U.S. Patent 5,997,974	Dec. 7, 1999
Schlueter, Jr. et al.	U.S. Patent 5,549,193	Aug. 27, 1996

Yu is directed to a method of making a seamed electrostatographic belt using laser ablation that eliminates the excessive thickness of the seam overlap region present in the prior art wherein the ends of the support sheet are laser ablated to have complementary shapes, are overlapped and bonded together (Column 3, lines 16-19; Column 7, line 63 to Column 8, line 22).

Schlueter '974 is directed to making an invisible seam ("seamless") electrostatographic belt wherein the two ends of a support sheet with complementary shapes formed by laser ablating are seamed together and then the support sheet has a series of coatings applied to provide a smooth and "seamless" electrostatographic belt (Column 4, lines 24-26; Column 6, lines 61-64; Column 12, lines 42-44; Figure 10; Column 14, lines 55-67).

Schlueter '193 is directed to making a seamed belt wherein the two ends of a support sheet with complementary shapes are seamed together using adhesive (Column 5, lines 39-41).

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claims 1-12, 14, 16-18 and 20-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yu (U.S. Patent 5,688,355) in view of Schlueter et al (U.S. Patent 5,997,974).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide an uncoated, single layer, homogeneous support sheet, laser ablate the ends, overlap and bond the ends together and then apply a series of coatings to the seamed belt in the method of Yu as suggested in Schlueter '974 in order to provide a smooth and "seamless" electrostatographic belt made in an economic and efficient manner.

Regarding claims 1 and 16, Yu is directed to a method of making a seamed electrostatographic belt using laser ablation that eliminates the excessive thickness of the seam overlap region present in the prior art wherein the ends of the flexible support sheet are laser ablated to have complementary shapes, are overlapped and bonded together (Column 3, lines 16-19; Column 7, line 63 to Column 8, line 22). This process results in a seamed belt have substantially no increased seam thickness (See Figures 6b, 7b, 8b, and 9b). Yu teaches that all the ultimate layers for the electrostatographic belt are coated on the support sheet prior to seaming and is silent towards applying at least one coating to the seamed belt.

Schlueter '974 is directed to making an invisible seam ("seamless") electrostatographic belt wherein the two ends of a homogeneous single layer support

sheet with complementary shapes formed by laser ablating are seamed together and then the support sheet has a series of coatings applied to provide a smooth and "seamless" electrostatographic belt (Column 4, lines 24-26; Column 6, lines 61-64; Column 12, lines 42-44; Figure 10; Column 14, lines 55-67). One skilled in the art would have readily appreciated that while Yu teaches the support sheet already having the various coatings applied before seaming, that coating the seamed support sheet of Yu with a series of coatings after seaming, rather than before, as taught in Schlueter '974 would result in a "seamless" electrostatographic belt with the added advantage of the surface being smooth and "seamless".

The electrostatographic belts of Yu and Schlueter '974 essentially have the same layers in the same order. One skilled in the art, looking at the art as a whole, would have readily appreciated that the various layers can be applied to the support sheet and the belt seamed as taught in Yu or to seam the support sheet and then applying the remaining layers as taught in Schlueter '974. The advantages of applying the layers after seaming the support sheet include having a "seamless" electrostatographic belt with a smooth and seamless surface. In addition, Schlueter '974 teaches that seaming the belt first and then applying the other layers is "by far the most economical" (Column 10, lines 40-42). It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide an uncoated, single layer, homogeneous support sheet, laser ablate the ends, overlap and bond the ends together and then apply a series of coatings to the seamed belt in the method of Yu as suggested in Schlueter

'974 in order to provide a smooth and "seamless" electrostatographic belt and made in an economic and efficient manner.

Regarding claim 11, Yu and Schlueter '974 teach one of the layers applied to form an electrostatographic belt is a photoconductive layer and one skilled in the art would have readily appreciated that the laser beam can't reach the entire end portion to form all the features at once and that there necessarily needs to be relative motion between the laser and the sheet. It would have been obvious to coat a photoconductive layer over the seamed belt and to move the support sheet relative to the laser to form the desired features in the method of Yu, as modified above.

Regarding claim 2 and 4, Yu teaches passing the laser through a mask (Column 17, lines 51-60).

Regarding claim 3, one skilled in the art would have readily appreciated that the first and second ends of the support sheet have complementary shapes so that two types of masks would be needed to shape the laser beam. It would have been obvious to have two masks in the process of Yu, as modified above.

Regarding claims 5, one skilled in the art would have readily appreciated that the laser beam can't reach the entire end portion to form all the features at once and that there necessarily needs to be relative motion between the laser and the sheet.

Regarding claims 6-7 and 10, laser beams are electromagnetic radiation and particle beams.

Regarding claim 8, Yu and Schlueter '974 teach one of the layers applied to form an electrostatographic belt is a photoconductive layer.

Regarding claim 9, Yu teaches ultrasonically welding the overlapped ends (Column 2, line 9).

Regarding claim 12, Yu teaches the laser beam illumination process (See Figure 5) described in the claim and furthermore such is well known and conventional in the art.

Regarding claims 14 Yu teaches a rabbeted joint (See Figures).

Regarding claim 17, one skilled in the art would have readily appreciated that the opposite surface of the opposite end would need to be shaped in order to have a rabbeted joint.

Regarding claim 18, Schlueter '974 teaches one of the layers applied to form an electrostatographic belt is a photoconductive layer (Column 12, lines 42-55).

Regarding claim 20, one skilled in the art would have readily appreciated that PET fits the parameters described for the flexible substrate sheet in Schlueter '974 (Column 11, lines 35-47) and it would have been obvious to use PET as the material for the flexible support sheet.

Regarding claim 21, Yu is teaches using a masked laser and having a photoconductive layer but is silent towards moving one of the laser and the sheet relative to the other. One skilled in the art would have readily appreciated that the laser beam can't reach the entire end portion to form all the features at once and that there necessarily needs to be relative motion between the laser and the sheet. It would have move one of the laser and the sheet relative to the other in the method of Yu, as modified above.

Regarding claim 22, Yu teaches ultrasonically welding the overlapped ends (Column 2, line 9).

Claims 13 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yu (U.S. Patent 5,688,355) in view of Schlueter et al (U.S. Patent 5,997,974), as applied above to claims 1-12, 14, and 16-25, and further in view of Schlueter et al (U.S. Patent 5,549,193).

Regarding claims 13 and 15, Yu teaches having a rabbeted joint but is silent towards use adhesive to bond, however such is well known in conventional in the art, as shown for example in Schlueter '193 (Column 5, lines 39-42). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use well known and conventional materials, such as adhesive, for seaming the belt together in the method of Yu, as modified above.

(10) Response to Argument

It is preliminarily noted that in making a determination of obviousness, one must look at what the combined teachings of the references would have suggested to those of ordinary skill in the art. As stated in *In re Keller*, 642 F.2d 413,425, 208 USPQ 871, 881 (CCPA 1981):

> The test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art.

In addition, it is well settled that with regard to the issue of obviousness, the combined teachings of the prior art as a whole must be considered. *EWP Corp. v. Reliance Universal, Inc.*, 755 F.2d 898, 907, 225 USPQ 20, 25 (Fed. Cir.), *cert. Denied*, 474 U.S. 843 (1985).

Coating the Seamed Belt to Form a "Seamless" Belt

Appellants' central argument is that claims 1-18 and 20-22 are patentable because there is no motivation to combine the teachings of Yu and Schlueter '974 to applying coatings to a seamed, homogeneous, single layer support sheet to form a "seamless" belt.

As noted above, Yu teaches providing a homogeneous, single layer support sheet, applying various coatings to form the layers necessary for an electrostatographic belt, laser ablating the ends of the coated support sheet to have complementary features and then overlapping and seaming the ends of the coated support sheet to form a seamed belt. In contrast, Schlueter '974 teachings providing a homogeneous, single layer support sheet, laser ablating the ends of the support sheet to have complementary features, seaming together the ends, and then applying the various coatings to form the layers necessary for an electrostatographic belt, thereby forming a "seamless" belt.

The electrostatographic belts of Yu and Schlueter '974 essentially have the same layers in the same order. One skilled in the art looking at the art as a whole would have readily appreciated that the various layers can be applied to the support

sheet and the belt seamed as taught in Yu or to seam the support sheet and then applying the remaining layers as taught in Schlueter '974. *See. In re Keller.* Furthermore, the advantages of applying the layers after seaming the support sheet include having a "seamless" electrostatographic belt with a smooth and seamless surface. **In addition, Schlueter '974 teaches that seaming the belt first and then applying the other layers is "by far the most economical" (Column 10, lines 40-42).** There is ample and sufficient motivation, as well as a reasonable expectation of success, to modify the process of Yu. It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide an uncoated, single layer, homogeneous support sheet, laser ablate the ends, overlap and bond the ends together and then apply a series of coatings to the seamed belt in the method of Yu as suggested in Schlueter '974 in order to provide a smooth and "seamless" electrostatographic belt made in an economic and efficient manner.

It appears that Appellants argue that there is no motivation to apply additional coatings to the seamed belt of Yu since all the layers needed for the electrostatographic belt were already applied before seaming (Appeal Brief, p. 12). However, that is not the combination the rejection makes. The rejection of the claims is that it would have been obvious to laser ablate and seam an uncoated, homogeneous, single layer support sheet and then apply the various coatings necessary for the electrostatographic belt to the seamed homogeneous, single layer support sheet, thereby forming a "seamless" belt, in the method of Yu as suggested in Schlueter '974.

No Added Seam Thickness

Appellants also argue that claims 16 and 21 are patentable because Yu does not teach a seamed belt having "substantially no increase in belt thickness at the seam".

Yu is taken as forming a seam with substantially no increased seam thickness. Yu is directed to eliminating the excessive thickness of the seam overlap region present in the prior art and teaches the ends of the flexible support sheet are laser ablated to have complementary shapes, are overlapped and bonded together (Column 3, lines 16-19). The thickness differentials depicted in Figures of 6b, 7b, 8b, and 9b of Yu have substantially no added seam thickness. Appellants' arguments to the contrary are not considered persuasive. Furthermore, the specification of the present application even cites Yu as teaching forming a seamed belt by "utilizing excimer laser ablation technique to remove precision amount of material from the bottom and top of two opposite ends of a imaging member cut sheet prior to overlapping the two opposite ends and ultrasonically weld the overlap into a welded seam. The resulting multi-layered imaging member belt thus obtained has a welded seam of little added thickness (paragraph 0022)" **Appellants indicated in their specification that Yu teaches forming a seam of little (substantially no) increased thickness.**

It is the Examiner's position that Appellants' method of laser ablating, overlapping, and seaming results in a seam equivalent to that in Yu as there is no indication that the present invention has found a way to further reduce the seam thickness in a seam formed utilizing the method of Yu. **This is evidenced in Appellants' own specification at paragraphs 0039 and 0040 where Appellants**

state that any increase in seam thickness using the prior art laser ablation method (Yu) is eliminated when applying the coatings after the seaming operation to form a "seamless" belt. The claim language requires bonding the ends of the belt to form a seam with substantially no increased thickness. The claims do not state that any increase in seam thickness that results from seaming is eliminated when coating the seamed belt with additional layers or applying at least one coating to form a seamless belt of constant thickness. Accordingly, Appellants' appear to use the method of Yu to laser ablate and form the seam and if Appellants form a seam with substantially no increased seam thickness then it follows that Appellants consider the method of Yu to result in seams with substantially no increased seam thickness.

Photoconductive Layer

Appellants also argue that claims 8, 11, 18, and 21 are patentable because there is no motivation to apply a photoconductive layer over a belt that already contains a conductive layer.

As discussed above, the rejection of the claims is that it would have been obvious to laser ablate and seam an uncoated, homogeneous, single layer support sheet and then apply the various coatings necessary for the electrostatographic belt to the seamed homogeneous, single layer support sheet, thereby forming a "seamless" belt, in the method of Yu as suggested in Schlueter '974. In the modified process of Yu, the seamed belt does not yet have a conductive layer. Yu teaches having a photoconductive layer as one of the layers of the electrostatographic belt (Column 8,

lines 23-38) as does Schlueter '974 (Column 14, lines 10-19). In the modified process of Yu, these photoconductive layers would be applied after the belt is seamed.

Flexible Substrate Sheet of PET

Appellants also argue the claim 20 is patentable because the references do not teach a support sheet of PET.

One skilled in the art would have readily appreciated that PET fits the parameters described for the flexible substrate sheet in Schlueter '974 (Column 11, lines 35-47) and thus it would have been obvious to use PET as the material for the flexible support sheet.

Conclusion

Appellants' arguments are not found persuasive, as there is sufficient motivation and suggestion to combine the art of record to form a seamed belt and then applying at least one coating to thereby form a "seamless" belt.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

John T. Haran

Conferees:

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